TERRESTRIAL CONTAMINATION OF AN ANTARCTIC CHONDRITE. A. Steele[1], D. T. Goddard[2], J. K. W. Toporski[3], D. Stapleton[3], D. D. Wynn-Williams[4], and D. McKay[1], [1]Mail Code SN2. NASA Johnson Space Center, Houston TX 77058, USA, [2]Research and Technology, BNFL, Springfield works, Preston PR4 0XJ, UK, [3]Department of Geology, University of Portsmouth, Portsmouth PO1 2DT, UK, [4]British Antarctic Survey, High Cross, Madingley Road, Cambridge CB3 0ET, UK.

The question of the existence of terrestrial organic contaminants in the Martian meteorite ALH 84001 has raised doubts over the pristine nature of Antarctic meteorites. In recent papers Bada and Jull (1997) show the presence of terrestrial organic contamination and conclude that the source of these compounds was the Antarctic ice (1,2). In the last decade there has been a revolution in our understanding of the organisms which colonise extreme environments, including Antarctica. A large number of organisms including bacterial, fungal and lichen species have been shown to inhabit Antarctic lakes ice and rocks eg. Cryptoendolithic communities [3,4].

In an attempt to elucidate whether terrestrial organisms could be involved in the contamination of Antarctic meteorites we examined two carbonaceous chondrites (ALHA 81024,26 C/B; ALHA 77176,11 B) and two ordinary chondrites (ALHA 81251,17 B/C; ALHA 76004,21 A/A). The meteorites were mounted onto stubs using carbon tape and sputter coated with Au/Pd for 30 s before imaging by scanning electron microscopy (SEM). Several rock samples from the Timber Peak region of Antarctica which are known to contain cryptoendolithic communities were also imaged under the same conditions as the meteorites.

Our preliminary investigations show the presence of a hyphae producing organism on ALHA 76004 (Fig. 1a). This organism resembles the fungal species shown to be present in the Timber Peaks cryptoendolithic samples (Fig. 1b). This clearly demonstrates that these meteorites can harbor the resident Antarctic microbiota. Mautener et al. (1997) have already shown that it is possible to produce thriving colonies of terrestrial bacteria from the nutrients contained in an ordinary chondrite [5]. To our knowledge this is the first recorded case of a terrestrial organism colonising and contaminating an Antarctic blue ice field meteorite. However, it is unlikely to be the last. Since the controversy over ALH 84001 the issue of Antarctic contamination has gathered impetus and more serious attempts are being made to define the depth of the problem. Our research has shown that out of 4 meteorites examined, one definitely contained evidence of colonisation by a terrestrial organism. Any analysis of the organic molecular species in ALHA 76004 could be significantly influenced by the presence of this organism, although the sample was taken from only 2–3mm from below the fusion crust. Certain questions arise from this research, how many other meteorites have been contaminated and to what extent? What is the rate and depth of penetration of the contaminant organisms into the meteorite? And how can we detect and nullify the effects of terrestrial contamination during analysis?

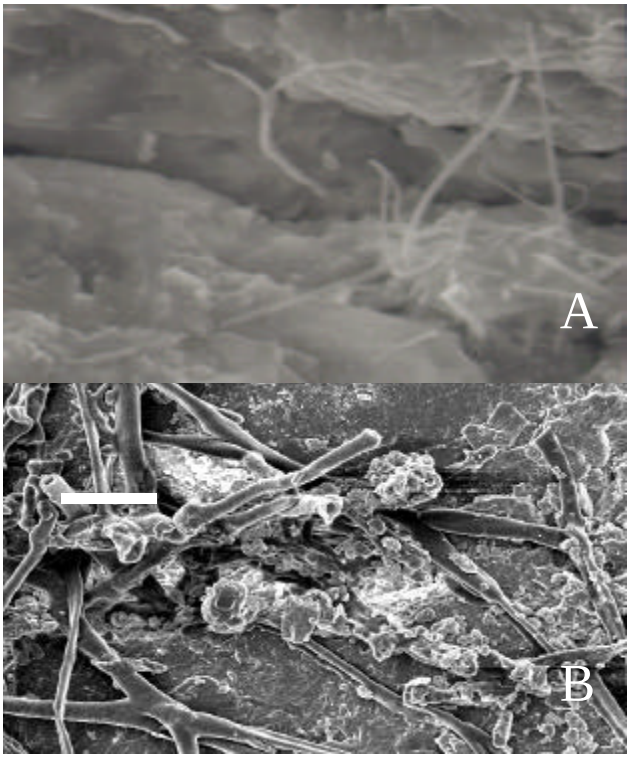

Fig. 1. (a) Image of Fungal like organism found on ALHA 76004 (×7500). **(b)** Image of a similar organism from the Timber peaks cryptoendolithic community (×20000). Scale bar = 1μm

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